

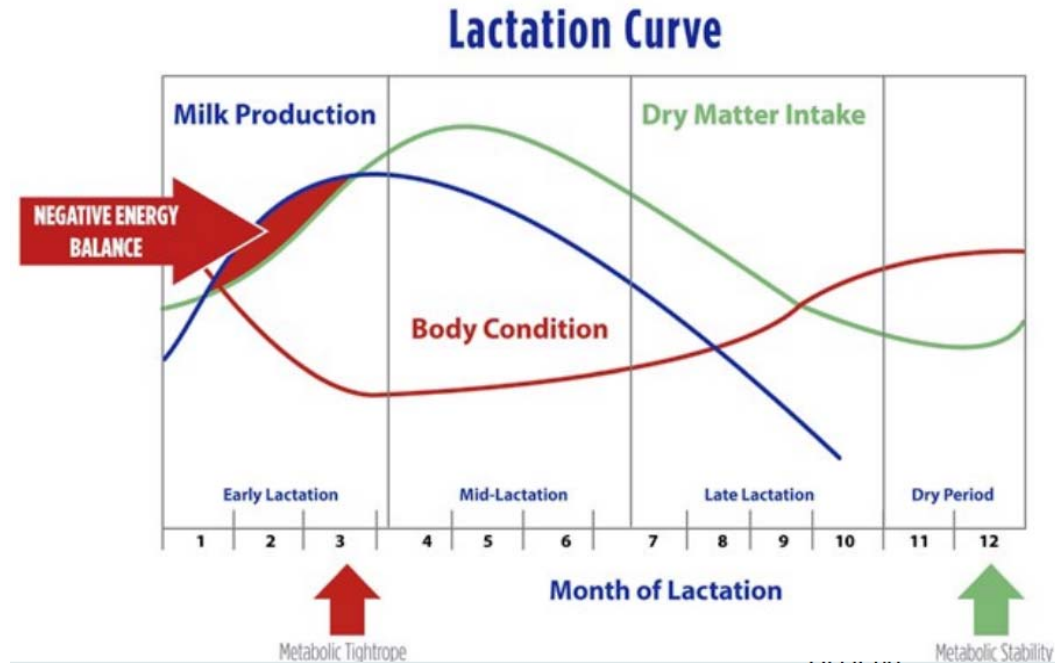


Body Conditions Scoring – first proposal for recommendations for recording and use for herd management, genetic improvement and welfare assessment

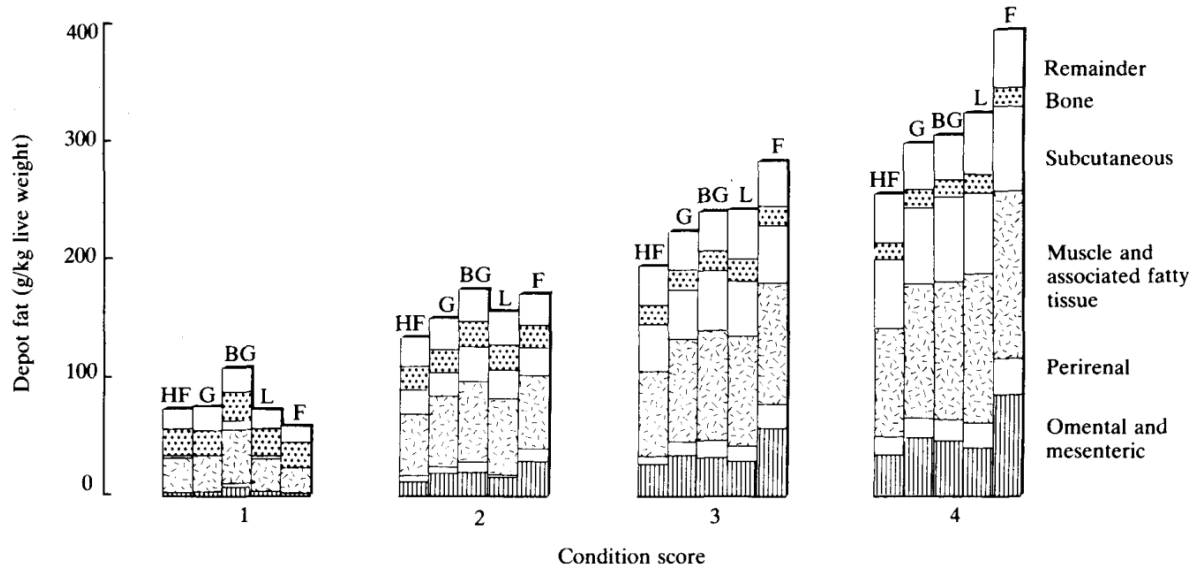
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Joint expert advisory group for BCS guidelines

Body Condition Scoring

- Fat reserves plays an important role in **early lactation** by buffering the cow against energy deficit
- BCS: widely accepted as the most practical method for assessing body fat content, mobilization and changes in energy reserves
- Rapid mobilization of fat reserves can cause fertility and health problems (e.g. metritis, ketosis)



BCS as an estimator of fat content



BCS linearly related to body fat content

Graph adapted from Wright And Russel (1984)

BODY CONDITION

Indicator or predictor of:

- Production
- Reproduction
- Health
- Animal Welfare

Diversity in Scales

- There is a large diversity of scales
 - based on purpose and different scales employed in different circumstances by different countries/organizations, some examples;

Scale	Interval (classes)	Visual or palpation	References
0 to 5	0.5 (11)	Palpation	Lowman et al (1976), Mulvany et al (1977), Wildman et al. (1982)
1 to 5	0.25 (17)	Visual	Ferguson et al. (1994)
1 to 10	0.5 (19)	Palpation	MacDonald and Roche (2004)
1 to 8	0.5 (15)	Visual	Earle (1976)
1 to 9	1 (9)	Visual	Landsverk (1992)

BCS an optimal intermediate trait, lower BCS → lean cows, higher BCS → obese

Diversity in BCS scoring systems

- Different scales and their implementation based on different circumstances and purposes such as herd management, welfare monitoring, and genetic evaluation → various BCS system.
- Within each system factors like granularity of scoring (i.e., scale used), population evaluated, timing, and frequency varies.
- Recent advancements in technology-driven BCS systems leading to other BCS systems.

Challenges:

- This variation can lead to confusion when comparing and difficulty exists in interpreting the results.
- Putting together data across different herds and different BCS systems, can require transformations of scales.

How to assess BCS: Manual Assessment

- **Headlock feed bunk** is the most suitable location;
 - proximity, obstruction-free observation, ability to touch, and easy identification
- Second most suitable: scoring from **inside the home pen** followed by assessment when **animals exit the milking parlor**.
- Another option would be to assess BCS from **outside the pen**



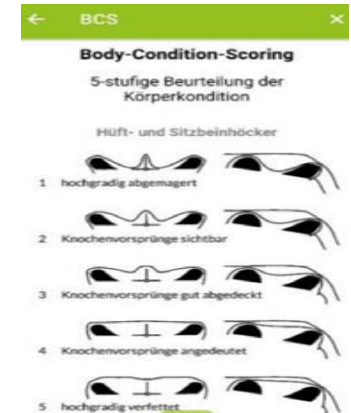
How to assess BCS: Digital tools

3 levels can be distinguished

1) Documentation and easy recording of visual assessment: e.g. via apps



Klaufenprofi

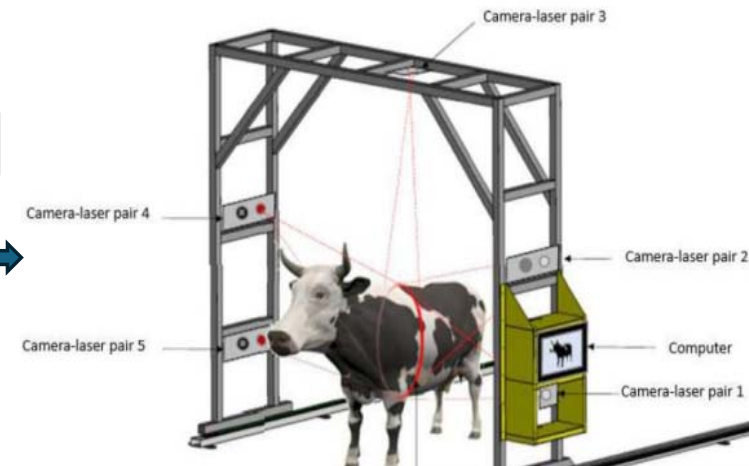


2) Technology-assisted assessments:

- should be easy to use, resilient to environmental disturbance, allow easy identification and data transfer

3) Technology driven assessment

- more reliable, more frequent measures for on-farm BCS assessment
- digital images of the rear aspect of the cow
- images converted into BCS scores



Conversion between BCS scales?

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Relationships Among International Body Condition Scoring Systems

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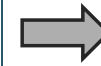


$$USA = 1.5 + 0.32 NZ$$

$$IRE = 0.81 + 0.4 NZ$$

$$AUS = 2.2 + 0.54 NZ$$

The commonality of the body parts assessed and the direction of BCS with increasing adiposity allows for mathematical interconversion (Garnsworthy, 2006)



1-4 scale: $BCS \times 4/3 - 1/3$
0-5 scale: $BCS \times 4/5 + 1$
1-8 scale: $BCS \times 4/7 + 3/7$
1-9 scale: $BCS/2 + 1/2$
1-10 scale: $BCS \times 4/9 + 5/9$

Underlying distribution of adiposity based on posteriori distribution



Mapping using Snell's Scores

Recommendations: Herd Management

- In general, **five BCS classes is usually sufficient** to capture significant BCS variability, however, can be increased or decreased;
 - these recommendations are organized according to the circumstances and purposes that are categorized as herd management, welfare assessment, and genetic evaluation

Purpose	BCS System	Frequency	Remarks
Feeding Advice	Minimum 5 classes	Frequent and longitudinal	Identification of cows with BCS change for optimization of feeding
Detection of metabolic disturbance	Minimum 5 classes	Before and after calving and at least 2 times before peak of lactation	Enables BCS change in the herd and indicates potential health problems
Welfare assessment	Minimum 3 classes		Detect general status of cows (thin-normal-fat)

Timing

For any of the purposes, the minimum timing can be roughly summarized as:

Dry off (7-8 weeks pre-calving)

Pre-calving (3 weeks pre-calving)

Early Lactation/
Pre-service

With an optimal recording scheme could be:

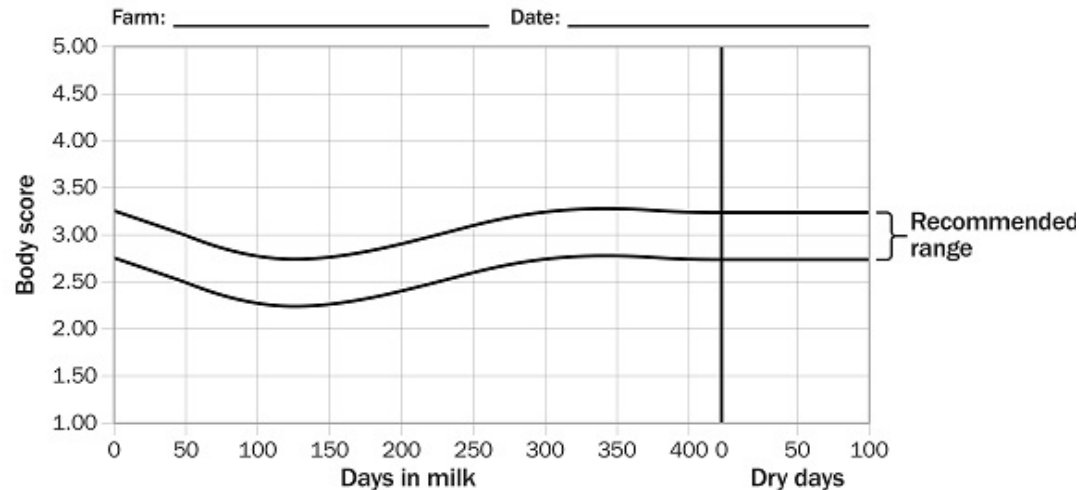
- Dry off, Pre-calving, **Calving**, Early lactation/Pre-service, **1st Service**, **Pregnancy check**, and **Late lactation**

Important considerations:

- The timing and no. of assessments depends upon specific application
- Representative random stratified sample of cows representing all lactations should be measured to ensure effective assessment

Recommendations : Individual Cow management

- Detection of extreme BCS animals is required for individual cow management
- Finer scales than only 5 classes and repeated recordings to enable detection of body condition changes



Adapted from: [Body condition scoring of dairy cattle | ontario.ca](http://Body%20condition%20scoring%20of%20dairy%20cattle%20|%20ontario.ca)

- We recommend to develop optimal BCS lactation curves based on breeds and management system
- Plot individual cows on this chart according to stage of lactation
 - Can be used to profile a herd at one point time or to monitor changes over a lactation for an individual cow

Important considerations

Training of the assessors:

- Clear understanding and training on the BCS Scoring System
- Standard Operating Procedures (SOP)
- Ensure harmonization between assessors
- Frequent evaluation of inter- and intra-assessors' repeatability

OTHER DATA TO RECORD:

- Unique Animal ID
- Herd ID
- Breed
- Date of Recording
- Assessor-ID
- BCS Scoring System
- Days to / from calving in relevant parity
- Parity number

Recommendations : Genetic Evaluation

- Potential as **auxiliary trait** for health problems (metabolic problems)

Current practice of recording: Organized in parallel to linear scoring

- Generally, **once in a lifetime** done during 1st lactation
- Using the same **1-9 scale** as for linear scores

Recommendation:

- BCS should be recorded on all cows on a **frequent basis**
- Repeated records can also be useful for the derivation of novel traits (resilience, resource allocation, health traits)
- Weakness of single recording on a cow level can be partially compensated by appropriate modeling of BCS changes on a bull level through its progeny

Summary

- **BCS is a very valuable information for different purposes;**
(herd management, auxiliary trait in genetic improvement,..)
- **Granularity/ scale depending on purposes;**
 - a minimum of 5 grades for optimization of feeding, detecting health problems,...
 - a minimum of 3 scales for welfare monitoring (too thin – okay – too fat)
- **Different possibilities for recording;**
(human, technology assisted, technology driven (3D camera))
- **Timing is important** – the more frequent the better → BCS changes
- **Training of assessors** crucial for comparability across farms,...

We are looking forward to your feedback and suggestions for improvement!



Thank you

Questions and/or any recommendations?